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EXAMINER

BAYARD, DJENANE M

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/756,189 | Applicant(s) BERGER ET AL. | |
| | Examiner DJENANE M. BAYARD | Art Unit 2441 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is in response to amendment filed on 1/02/09 in which claims 1-36 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection. The newly added prior art of Sim teaches providing access to an aggregated set of files through the virtual file system.

As per claim 2, Applicant argues that Coates fails to disclose forwarding the server file access transaction to a selected one of the plurality of server computer systems specified by the metadata associated with the virtual filesystem. However, Coates clearly teaches wherein directory path information is performed by the VFS. Furthermore, Coates clearly teaches indication of the location of the file by maintaining in the VFS (virtual file systems) for each object file, the customer file directory including the customer assigned filename and the unique network storage system file identifiers (*metadata*) (See paragraph [0098]).

As per claim 3, Applicant argues that Coates fails to teach a central authority that specifies a physical location for the object file. However, Coates clearly teaches an indication of the location of the file by maintaining in the VFS (virtual file systems) for each object file, the customer file directory including the customer assigned filename and the unique network storage system file identifiers (See paragraph [0098]).

As per claim 5, Applicant argues that Coates fails to disclose maintaining active directory of file transaction in these tables. However, Coates clearly teaches wherein the directory operation is a "move file" operation, and then a database operation is performed to revise an

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entry in the file table to reflect the new location of the file. The "move file" operation includes a new destination for the file as an argument in the directory request (See paragraph [0110]).

As per claim 7, Coates clearly teaches an indication of the location of the file by maintaining in the VFS (virtual file systems) for each object file, the customer file directory including the customer assigned filename and the unique network storage system file identifiers (See paragraph [0098]).

As per claim 12, Coates if an object is in high demand, the storage cluster, using a load balancing fabric that selects the different DOSMs, fetches, for storage in each of the DOSM data caches, a copy of the high demand object (See paragraph [0118]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 1-15, 19-20, 27-29 and 30-36 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates et al and further in view of U.S. Patent Application No. 2002/0083118 to Sim.

a. As per claims 1, 29 and 35, Coates et al teaches a method for processing client file access transactions, the method comprising the steps of: in an adaptive load balancer presenting a virtual file system to a client computer system, the virtual files system providing access to an aggregated set of files stored a plurality of server file systems respectively associated with a plurality of server computer systems respectively associated with a plurality of server computer systems(See page 3, paragraph [0054]; receiving a client file access transaction from the client computer system, the client file access transaction specifying a file access operation to be performed relative to the virtual file system presented to the client computer system (See page 14 and 15, paragraph [0158], *client local file system command is a directory operation, then XML request to the VFS is generated to perform the directory operation in the VFS*); processing the client file access transaction in relation to metadata associated with the virtual file system to perform at least one of: if the file access operation requires access to a file stored by the plurality of server file systems, then translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems according to the file access

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operation specified by the client file access transaction (See page 7, paragraph [0094], page 8, paragraph [0103], page 13, paragraph [0147], page 14, paragraph [0150], *translation between the client's local file system and the network storage file system*) ; and if the file access operation does not require access to a file stored by the plurality of server file systems, then accessing metadata associated with the virtual file system to complete processing of the file access operation specified by the client file access transaction (See page 14, paragraph [0154]) . However, Coates et al fails to teach wherein the access to the aggregated set of files is provided through the virtual file system.

Sim teaches wherein control portions are pulled from the appropriate distribution servers and assembled by the VFCS (See paragraph [0124]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Sim in the claimed invention of Coates et al in order to mount the Virtual File system as a remote file system providing access to content in the distribution servers (See paragraph [0120]).

b. As per claim 33, Coates et al teaches an adaptive load balancer comprising: a processor; a memory; a first communications interface capable of communicating with a client computer system; a second communications interface capable of communicating with a plurality of server computer systems; and an interconnection mechanism coupling the processor, the memory, the first communications interface and the second communications interface and wherein the memory is encoded with an adaptive transaction application that when performed on the processor(See paragraph 0062] and figure 3), produces an adaptive transaction processor that

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causes the adaptive load balancer to perform the operations of: presenting a virtual file system to the client computer system via the first communications interface, the virtual file system providing access to an aggregated set of files stored by a plurality of server file systems respectively associated with the plurality of server computer systems (See paragraph [0054]); receiving a client file access transaction from the client computer system via the first communications interface, the client file access transaction specifying a file access operation to be performed relative to the virtual file system presented to the client computer system (See page 14 and 15, paragraph [0158], *client local file system command is a directory operation, then XML request to the VFS is generated to perform the directory operation in the VFS*; processing the client file access transaction in relation to metadata encoded in the memory associated with the virtual file system to perform at least one of: if the file access operation requires access to a file stored by the plurality of server file systems, then translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems according to the file access operation specified by the client file access transaction over the second communications interface transaction (See page 7, paragraph [0094], page 8, paragraph [0103], page 13, paragraph [0147], page 14, paragraph [0150], *translation between the client's local file system and the network storage file system*); and if the file access operation does not require access to a file stored by the plurality of server file systems, then accessing the metadata in the memory associated with the virtual file system to complete processing of the file access operation specified by the client file access transaction (See page 14, paragraph [0154]).

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However, Coates et al fails to teach wherein the access to the aggregated set of files is provided through the virtual file system.

Sim teaches wherein control portions are pulled from the appropriate distribution servers and assembled by the VFCS (See paragraph [0124]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Sim in the claimed invention of Coates et al in order to mount the Virtual File system as a remote file system providing access to content in the distribution servers (See paragraph [0120]).

c. As per claims 2, 34 and 36, Coates et al teaches wherein if the file access operation requires access to a file stored by the plurality of server file systems, the method comprises: forwarding the server file access transaction to a selected one of the plurality of server computer systems specified by the metadata for processing of the file access operation specified by the client file access transaction by the selected one of the plurality of server computer systems (See page 8, paragraph [0098-0100]); receiving a server transaction response from the server computer system to which the server file access transaction was forwarded; translating, using the metadata associated with the virtual file system, the server transaction response into a client file access response; and forwarding the client file access response to the client computer system from which the client file access transaction was received (See page 9, paragraph [0111]).

d. As per claim 3, Coates et al teaches maintaining the metadata associated with the virtual file system in at least one forwarding table containing forwarding table entries that provide a

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mapping of virtual file system parameters to physical file system parameters, the mapping including: a mapping of virtual file identifiers corresponding to each available file accessible by client computer systems in the virtual file system to: i) at least one corresponding physical file identifier; and ii) at least one server computer system of the plurality of server computer systems at which an instance of that file can be accessed using that corresponding physical file identifier (See page 8, paragraph [0104]).

e. As per claim 4, Coates et al teaches wherein translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction comprises: obtaining a virtual file identifier specified in the client file access transaction (See paragraph [0015 and 0091]; matching the virtual file identifier specified in the client file access transaction to a matching forwarding table entry in the at least one forwarding table to identify a corresponding physical file identifier contained in the matching forwarding table entry (See paragraph [0015]; creating the server file access transaction by replacing the virtual file identifier specified in the client file access transaction with the corresponding physical file identifier contained in matching forwarding table entry (See paragraph [0176]) wherein forwarding the server file access transaction to a selected one of the plurality of server computer systems comprises: identifying, from the matching forwarding table entry, the at least one server computer system at which an instance of that file can be accessed using the corresponding physical file identifier; forwarding the server file access transaction to a server computer system corresponding to the identified at least one server computer system at which an instance of that file can be accessed (See paragraph [0176]).

f. As per claim 5, Coates et al teaches maintaining an active transaction table that associates client file access transactions to corresponding server file access transactions (See paragraph [0104] and figure 12); and wherein receiving a client file access transaction comprises: assigning a client transaction identity to the received client file access transaction (See paragraph [0106]); and determining if the active transaction table contains an active transaction table entry that corresponds to the client transaction identity, and if not, creating an active transaction table entry containing the assigned client transaction identity and an identity of the client computer system from which the client file access transaction was received (See paragraph [0102-0104 and 0110]); wherein creating the server file access transaction comprises: assigning a server transaction identity to the created server file access transaction; and storing the server transaction identity in the active transaction table entry that contains the client transaction identity of the received client file access transaction that was translated to the created server file access transaction (See paragraph [0102-0104 and 0110]).

g. As per claim 6, Coates et al teaches wherein translating, using the metadata associated with the virtual file system, the server transaction response into a client file access response comprises: obtaining a physical file identifier specified in the server transaction response; matching the physical file identifier specified in the server transaction response to a matching forwarding table entry in the at least one forwarding table to identify a corresponding virtual file identifier contained in the matching forwarding table entry; replacing the physical file identifier specified in the server transaction response with the corresponding virtual file identifier

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contained in matching forwarding table entry to create the client file access response; and wherein forwarding the client file access response to the client computer system comprises: obtaining a server transaction identity specified in the server transaction response; matching the server transaction identity to an active transaction table entry containing that server transaction identity in the an active transaction table to obtain a client transaction identity that corresponds to that server transaction identity; and forwarding the client file access response to a client computer system corresponding to a client computer system associated with the client transaction identity identified in matching active transaction table entry in the active transaction table (See paragraph [0150-0154]).

h. As per claim 7, Coates et al teaches wherein the at least one forwarding table includes: a directory location mapping table containing a mapping of virtual file identities of parent and child directories within the virtual file system, the parent and child directories representing an aggregation of directory structures present within respective server file systems of the plurality of file servers; and a set of directory file mapping tables, one for each directory in the virtual file system, each directory file mapping table containing a mapping of virtual file identities of files within the virtual file system of that directory to physical file identities of a corresponding file and server computer system and within an aggregation of the respective server file systems of each of the plurality of file servers (See paragraph [0101-0104])

i. As per claim 8, Coates et al teaches wherein processing the client file access transaction in relation to metadata associated with the virtual file system comprises: obtaining a virtual file

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identity within the client file access transaction (See paragraph [0015]; comparing a directory portion of the virtual file identity to the directory location mapping table to identify a destination virtual file identity of a directory in the virtual file system that contains a file to be accessed according to the file access operation specified in the client file access transaction (See paragraph [0077, 0079-0080]; identifying a specific directory file mapping table within the set of directory filemapping tables that corresponds to the destination virtual file identity of the directory in the virtual file system that contains a file to be accessed according to the file access operation specified in the client file access transaction (See paragraph [0085]); within the specific identified directory file mapping table, comparing a file portion of the virtual file identity to directory file mapping table entries to identify at least one matching directory file mapping table entry that contains the file portion of the virtual file identity in order to identify a server computer system of the plurality of server computer systems and a physical file identity of a file on that server computer system that corresponds to the file to be accessed according to the file access operation specified in the client file access transaction (See paragraph [0085]).

j. As per claim 9, Coates et al teaches wherein comparing a file portion of the virtual file identity to directory file mapping table entries to identify at least one matching directory file mapping table entry comprises: identifying a plurality of matching directory file mapping table entries that each contains the file portion of the virtual file identity, thus indicating that the file to be accessed according to the file access operation specified in the client file access transaction is replicated in at least two locations within the plurality of server computer systems (See

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paragraph [0130-0133]).

k. As per claim 10, Coates et al teaches wherein the plurality of server computer systems includes: a first server computer system that provides a first server file system having a first set of files available within the virtual file system; a second server computer system that provides a second server file system having a second set of files available within the virtual file system; and wherein: the first set of files contains different files than the second set of files; the adaptive load balancer presents the first and second set of files as the aggregated set of files without identifying to the client computer system that the first and second set of files are stored on respective first and second server computer systems; and the adaptive load balancer uses the metadata associated with the virtual file system to manage access to the first and second set of files within the first and second server computer systems on behalf of client computer systems - requesting access to the set of files (See paragraph [0062, 0077-0078]).

l. As per claim 11, Coates et al teaches wherein the virtual file system provided by the adaptive load balancer provides at least one file accessible to the client computer systems that is replicated within the first and second file systems on the first and second server computer systems (See paragraph [0130-0133]).

m. As per claim 12, Coates et al teaches detecting a trend of access to a file within the virtual file system by tracking file access patterns to the file by at least one client computer system; in response to detecting the trend of access, performing a migration operation on the file for

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which the trend is detected in order to manage access to the file (See paragraph [0118]).

n. As per claim 13, Coates et al teaches wherein detecting a trend of access to a file comprises: detecting frequent access to a file over a time period; and wherein performing a migration operation on the file comprises: replicating the file to at least one server computer system that does not contain the file within its file system at the time of detecting frequent access to a file. (See paragraph [0117-0118]).

o. As per claim 14, Coates et al teaches wherein replicating the file to at least one server computer system that does not contain the file within its file system at the time of detecting frequent access to a file comprises: selecting, as the at least one server computer system for replicating the file, at least one server computer system that is of higher performance in relation to at least one other server computer system in the plurality of server computer systems available to store the replicate file (See paragraph [0117-0118]).

p. As per claim 15, Coates et al teaches wherein detecting a trend of access to a file comprises: detecting infrequent access to a file over a time period; and wherein performing a migration operation on the file comprises: identifying, using metadata associated with the virtual file system, that the file is replicated across a plurality of server file systems of respective server computer systems; in response to identifying that the file is replicated, instructing at least one server computer system that maintains a replicated copy of the file within its server file system to remove the replicated copy (See paragraph [0116]).

q. As per claim 19, Coates et al teaches wherein the file access operation specified by the client file access transaction is a metadata-only operation that the adaptive load balancer can perform by accessing the metadata associated with the virtual file system without requiring access to files stored within respective file systems of the plurality of computer systems (See page 9, paragraph [0108-0112]).

r. As per claim 20, Coates et al teaches wherein: the file access operation in the client file access transaction specifies an operation to be performed on directories and files of the virtual file systems that the adaptive load balancer provides access to using the Network File System protocol; and wherein the file access operation is a Network File System operation including at least one of a CREATE operation, a MKDIR operation, a READDIR operation and a STATFS operation (See page 9, paragraph [0108-0112]).

s. As per claim 27, Coates et al teaches wherein presenting the virtual file system to the client computer system comprises: aggregating a set of files and directories accessible in the respective file systems of each of the plurality of server computer systems to appear to client computer systems as the virtual file system (See paragraph [0054]); exposing the set of files and directories aggregated in the virtual file system to client computer systems using a file access protocol compatible with the client computer systems such that virtual file system is presented to client computer systems as a single virtual file system providing a single point of access to the

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files and directories of the aggregated set of file and directories of each of the plurality of server computer systems (See paragraph [0054-0056])

t. As per claim 28, Coates et al teaches wherein the file access protocol in at least one of the Network File System (NFS) protocol and the Common Internet File System (CIFS) protocol and the Hypertext Transfer Protocol and the Simple Object Access Protocol (See paragraph [0056]).

u. As per claim 30, Coates et al teaches wherein: the virtual data system is a virtual file system and the server data systems are server file systems respectively associated with each of the plurality of server computer systems (See paragraph [0054]); the aggregated set of data of the virtual file system is a collective set of files stored within each of the server file systems of each of the plurality of server computer systems (See paragraph [0055]); the client data access transaction is a file system request for access to information associated with a file presented to the client computer system within the virtual file system; and wherein the metadata is information maintained by the adaptive load balancer to map virtual file parameters within file system requests provided from client computer systems for access to information associated with a file presented within the virtual file system to corresponding physical file parameters of an instance of a file in at least one of the server file system maintained by at least one of the server computer systems (See paragraph [0062, 0104]).

v. As per claim 31, Coates et al teaches wherein: the virtual data system is a virtual web service system and the server data systems are web services data systems respectively associated

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with each of the plurality of server computer systems (See paragraph [0054, 0057, 0059]); the aggregated set of data of the virtual data system is a collective set of service objects stored within each of the web services data systems of each of the plurality of server computer systems (See paragraph [0055]); the client data access transaction is a web request for access to information associated with a service object presented to the client computer system within the virtual web service system; and wherein the metadata is information maintained by the adaptive load balancer to map virtual object parameters within web requests provided from client computer systems for access to information associated with a service object presented within the virtual data system to corresponding physical object parameters of an instance of a service object in at least one of the web services data systems maintained by at least one of the server computer systems (See paragraph [0058-0059, 0062 and 0104]).

w. As per claim 32, Coates et al teaches wherein the adaptive load balancer services client data transactions and operates in conjunction with the server file systems of each of the server computer systems according to at least one of the NFS, protocol and the CIFS protocol. (See paragraph [0056]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent Application No. 2004/0255016 to Hundscheidt et al.

a. As per claim 16, Coates et al fails to teach wherein instructing at least one server computer system that maintains a replicated copy of the file within its server file system to remove the replicated copy comprises: selecting, as the at least one server computer system from which the replicated copy of the file is to be removed, at least one server computer system that contains a replicated copy of the file and that is of higher performance relative to other server computer systems in the plurality of server computer systems.

Hundscheidt et al teaches selecting, as the at least one server computer system from which the replicated copy of the file is to be removed, at least one server computer system that contains a replicated copy of the file and that is of higher performance relative to other server computer systems in the plurality of server computer systems (See paragraph [0049]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Hundscheidt et al in the claimed invention of Coates et al in order to provide a solution for an efficient utilization of the storage resources in a caching architecture (See paragraph [0015]).

b. As per claim 17, Coates et al fails to teach wherein detecting a trend of access to a file comprises: detecting infrequent access to a file over a time period; and wherein performing a

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migration operation on the file comprises: migrating the file from a higher performing server computer system to a lower performing server computer system.

Hundscheidt et al teaches detecting infrequent access to a file over a time period; and wherein performing a migration operation on the file comprises: migrating the file from a higher performing server computer system to a lower performing server computer system (See paragraph [0049]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Hundscheidt et al in the claimed invention of Coates et al in order to provide a solution for an efficient utilization of the storage resources in a caching architecture (See paragraph [0015]).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent No. 6,748,420 to Quatrano et al.

a. As per claim 18, Coates et al fails to teach wherein receiving a client file access transaction comprises: identifying that the client file access transaction received from the client computer system is a duplicate client file access transaction within the active transaction table; in response to identifying that the client file access transaction is a duplicate, ignoring the duplicate file access transaction and bypassing processing the client file access transaction in relation to metadata associated with the virtual file system.

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Quatrano et al teaches identifying that the client file access transaction received from the client computer system is a duplicate client file access transaction within the active transaction table; in response to identifying that the client file access transaction is a duplicate, ignoring the duplicate file access transaction and bypassing processing the client file access transaction in relation to metadata associated with the virtual file system (See col. 5, lines 41-54)

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Quatrano et al in the claimed invention of Coates et al in order to prevent redundant application transactions (See col. 5, lines 41-54).

8. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent Application No. 2002/0059263 to Shima et al.

a. As per claim 21, Coates fails to teach wherein the file access operation is a STATFS operation and 20 wherein accessing metadata associated with the virtual file system to complete processing of the file access operation specified by the client file access transaction comprises: calculating an amount of storage space associated with each server file system of the plurality of server computer systems that is provided within the virtual file system; and providing a client file access response to the client computer system that indicates an amount of file storage space available for storage of data within the virtual file system that is based on the calculated amount of storage space associated with each server file system.

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Shima et al teaches calculating an amount of storage space associated with each server file system of the plurality of server computer systems that is provided within the virtual file system; and providing a client file access response to the client computer system that indicates an amount of file storage space available for storage of data within the virtual file system that is based on the calculated amount of storage space associated with each server file system (See paragraph [0066]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Shima et al in the claimed invention of Coates in order to determine free available space (See paragraph [0066]).

b. As per claim 22, Coates et al fails to teach wherein calculating an amount of storage space associated with each server file system comprises: calculating a total amount of current free space within each server file system of the plurality of server computer systems that is provided within the virtual file system; identifying a replicated amount of storage of replicated files within the set of server file systems maintained by the respective server computer systems within the virtual file system; calculating a potential amount of total storage space as the total amount of current free space in addition to the replicated amount of storage of replicated files within the set of server file systems; and setting the amount of file storage space available for storage of data within the virtual file system equal to the potential amount of total storage space.

Shima et al teaches wherein calculating an amount of storage space associated with each server file system comprises: calculating a total amount of current free space within each server file system of the plurality of server computer systems that is provided within the virtual file

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system; identifying a replicated amount of storage of replicated files within the set of server file systems maintained by the respective server computer systems within the virtual file system; calculating a potential amount of total storage space as the total amount of current free space in addition to the replicated amount of storage of replicated files within the set of server file systems; and setting the amount of file storage space available for storage of data within the virtual file system equal to the potential amount of total storage space.

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Shima et al in the claimed invention of Coates et al in order to determine free available space (See paragraph [0066]).

9. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent Application No. 2004/0003266 to Moshir et al.

a. As per claim 23, Coates et al fails to teach wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein receiving a server transaction response from the server computer system to which the server file access transaction was forwarded comprises: identifying that the server transaction response indicates completion of modification of a file within a first server file system of a first server computer system as specified in the file access operation specified by the client file access transaction; identifying if replicated copies of the file that was modified exist within server file systems of server computer systems other than the first

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server computer system; and if replicated copies of the file that was modified exist, then performing an update replica operation comprising: i) indicating, within the metadata of the virtual file system associated with the file that was modified, that the file in the first server file system on the first server computer system is a master copy of the file; ii) indicating, within the metadata of the virtual file system associated with the replicated copies of the file, that each replicated copy is a non-master copy of the file.

Moshir et al teaches wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein receiving a server transaction response from the server computer system to which the server file access transaction was forwarded comprises: identifying that the server transaction response indicates completion of modification of a file within a first server file system of a first server computer system as specified in the file access operation specified by the client file access transaction; identifying if replicated copies of the file that was modified exist within server file systems of server computer systems other than the first server computer system; and if replicated copies of the file that was modified exist, then performing an update replica operation comprising: i) indicating, within the metadata of the virtual file system associated with the file that was modified, that the file in the first server file system on the first server computer system is a master copy of the file; ii) indicating, within the metadata of the virtual file system associated with the replicated copies of the file, that each replicated copy is a non-master copy of the file (See paragraph [0152-0154]).

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It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Moshir et al in the claimed invention of Coates et al in order to provide content replication (See paragraph [0152-0154]).

b. As per claim 24, Coates et al fails to teach wherein performing the update replica operation further comprises: incrementally updating each replicated copy of the file that is indicated as a non- master copy of the file such that the replicated copies of the file contain the same content as the file that was modified.

Moshir et al teaches incrementally updating each replicated copy of the file that is indicated as a non- master copy of the file such that the replicated copies of the file contain the same content as the file that was modified (See paragraph [0152-0154]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Moshir et al in the claimed invention of Coates et al in order to provide content replication (See paragraph [0152-0154]).

10. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent Application No. 2006/0112151 to Manley et al.

a. As per claim 25, Coates et al fails to teach wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein receiving a server transaction response from the

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server computer system to which the server file access transaction was forwarded comprises: identifying that the server transaction response indicates completion of modification of" a file within a first server file system of a first server computer system as specified in the file access operation specified by the client file access transaction; identifying if replicated copies of the file that was modified exist within server file systems of server computer systems other than the first server computer system; and if replicated copies of the file that was modified exist, then deleting each replicated copy of the file within respective server file systems of server computer systems that maintain a replicated copy of that file, such that file that was modified in the first server file system is the only copy of that file that remains accessible to client computer systems within the virtual file system.

Manley et al teaches wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein receiving a server transaction response from the server computer system to which the server file access transaction was forwarded comprises: identifying that the server transaction response indicates completion of modification of" a file within a first server file system of a first server computer system as specified in the file access operation specified by the client file access transaction; identifying if replicated copies of the file that was modified exist within server file systems of server computer systems other than the first server computer system; and if replicated copies of the file that was modified exist, then deleting each replicated copy of the file within respective server file systems of server computer systems that maintain a replicated copy of that file, such that file that was modified in the

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first server file system is the only copy of that file that remains accessible to client computer systems within the virtual file system (See paragraph [0130]).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Manley et al in the claimed invention of Coates et al in order to improve reliability and facilitate disaster recovery in the event of a failure (See paragraph [0015]).

11. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2005/0246393 to Coates in view of U.S. Patent Application No. 2002/0083118 to Sim and further in view of U.S. Patent Application No. 2006/0184589 to Lees et al.

a. As per claim 26, Coates et al fails to teach wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems comprises: identifying if replicated copies of the file to be modified exist in the virtual file system within a plurality of server file systems of the plurality of server computer systems; and if replicated copies of the file to be modified exist, translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to each copy of the replicated file maintained within the server file systems of the plurality of server computer systems; and wherein forwarding the server file access transaction to

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a selected one of the plurality of server computer systems specified by the metadata for processing of the file access operation comprises: forwarding the server file access transaction to each of the plurality of server computer systems specified by the metadata that contains a replicated copy of the file to be modified for processing of the file access operation on each replicated copy of the file.

Lees et al teaches wherein the file access operation specified by the client file access transaction is a file access operation that requires modification of a file within the virtual file system; and wherein translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to the file maintained within one of the plurality of server computer systems comprises: identifying if replicated copies of the file to be modified exist in the virtual file system within a plurality of server file systems of the plurality of server computer systems; and if replicated copies of the file to be modified exist, translating, using the metadata associated with the virtual file system, the client file access transaction into a server file access transaction for access to each copy of the replicated file maintained within the server file systems of the plurality of server computer systems; and wherein forwarding the server file access transaction to a selected one of the plurality of server computer systems specified by the metadata for processing of the file access operation comprises: forwarding the server file access transaction to each of the plurality of server computer systems specified by the metadata that contains a replicated copy of the file to be modified for processing of the file access operation on each replicated copy of the file (See paragraph [0084]).

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It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the teaching of Lees et al in the claimed invention of Coates et al in order replicate multi-valued object attribute (See paragraph [0041]).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DJENANE M. BAYARD whose telephone number is (571)272-3878. The examiner can normally be reached on Monday- Friday 5:30 AM- 3:00 PM..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on (571) 272-3880. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. M. B./

Examiner, Art Unit 2441

/William C. Vaughn, Jr./

Supervisory Patent Examiner, Art Unit 2444